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Solutions Taking Shape.

TECHNICAL PROPOSAL FOR ENGINEERING INVESTIGATION OF RAILROAD EMBANKMENT (BERM); RADNOR YARD

NASHVILLE, TENNESSEE

PREPARED FOR:

CSX TRANSPORTATION

PREPARED BY:

OGDEN ENVIRONMENTAL & ENERGY SERVICES CO.

OGDEN PROPOSAL NO: 4-9999-7171-2194

AUGUST 2, 1994

OGDEN *ENVIRONMENTAL AND ENERGY SERVICES*

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AUGUST 2, 1994

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OGDEN *ENVIRONMENTAL AND ENERGY SERVICES*

2 8 1493

3325 Perimeter Hill Dr.
Nashville, TN 37211
615 333 0630
Fax 615 331 4715

August 2, 1994

Mr. K.W. Richardson, P.E.
Senior Manger - Environmental
CSX Transportation
500 Water Street
Jacksonville, Florida 32202

Re: Technical Proposal for Engineering Investigation of Railroad Embankment (Berm); Radnor Yard Nashville, Tennessee Ogden Proposal No. 4-9999-7171-2194

Dear Mr. Richardson:

In accordance with your request, we herewith present our technical proposal for a geotechnical and environmental engineering investigation of the railroad embankment (berm) at Radnor Yard. The following text presents our understanding of the project and our proposed work plan. Our cost proposal is presented separately.

The Association of Firms Practicing in the Geosciences has prepared important information pertaining to the studies such as this. A copy of their published circular is included as Attachment 1 for your review.

<u>SITE AND PROJECT DESCRIPTION</u>
The subject berm is located on the east side of Radnor Yard adjacent to the SAAD Trousdale Drive (Superfund) Site in south Nashville, Davidson County, Tennessee. A general site plan is presented on the following page.

The berm is about 20 feet high and the east slope is steeply inclined at about 1 unit horizontal (H) to 1 unit vertical (V). The toe of the east slope coincides roughly with the rear property lines of the businesses along Trousdale Drive. The berm supports a network of active rail lines. A mainline track is located about 30 feet from the east edge of the berm. An active spur track and a partial siding are located between the mainline and berm edge.

We understand that the US EPA and others intend to carry out an additional removal action associated with SAAD Site east of the railroad. The removal will include an 800 cubic yard excavation behind the Franklin Brick Company Building. The excavation limits will generally extend westward toward the toe of the CSX berm outside a ten foot standoff from the berm toe. Any excavation within the ten foot standoff could impact Railroad operations, particularly if the mainline track is affected.

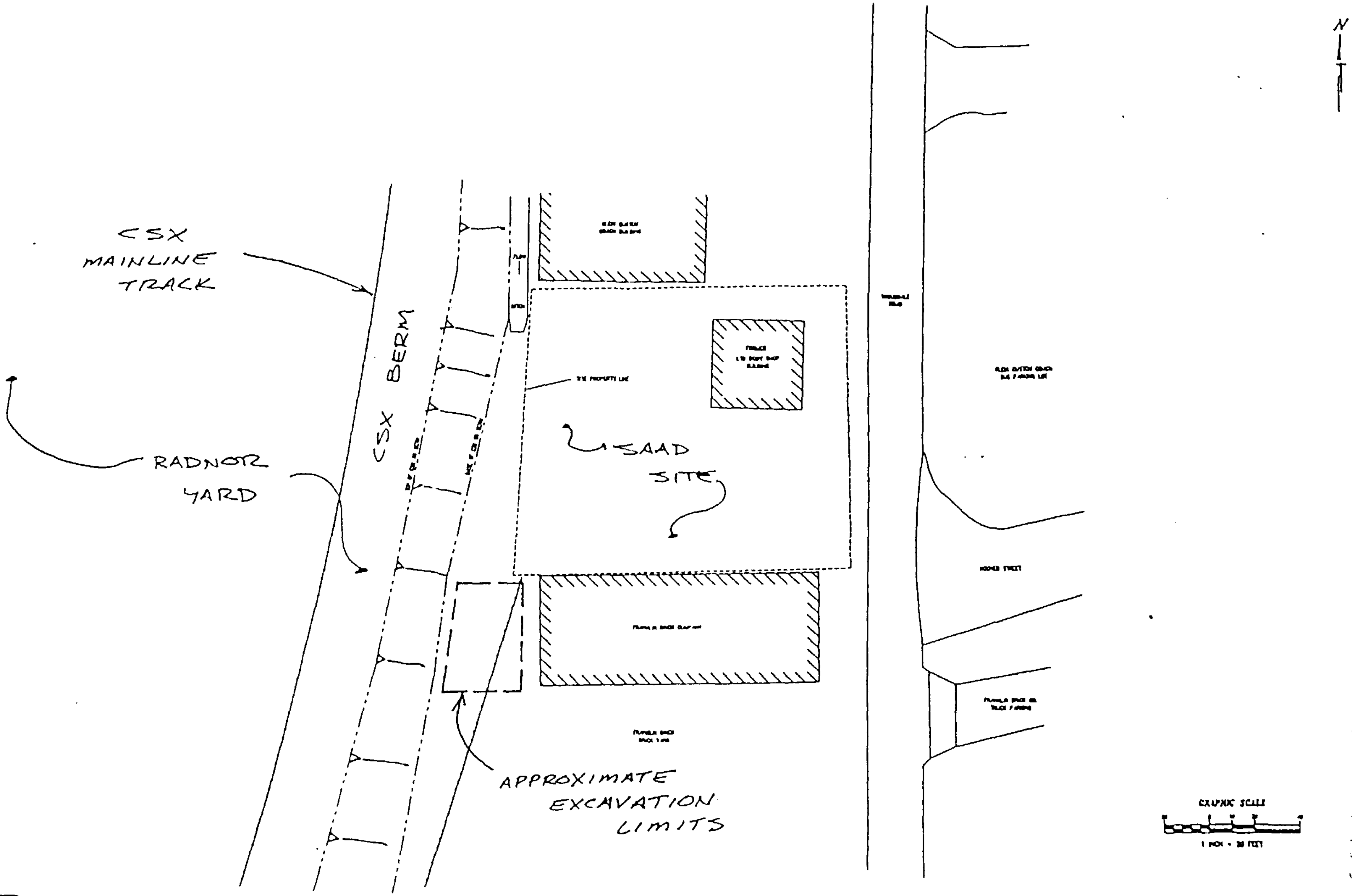

FIGURE 1 - GENERAL SITE PLAN

OGDEN

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The SAAD Site has been subject to a series of environmental investigations and removal actions beginning in 1978. The most recent action was a Phase II removal in October 1992. The investigations indicated contamination on the SAAD property was primarily limited to ethylbenzene, toluene, xylene and trichloroethene. Recent sampling indicates that total recoverable petroleum hydrocarbons (TRPH) were the most widespread site contaminant. A summary of background information about the site is provided as Attachment 2.

The previous investigations and testing programs were appropriately tailored to address the environmental concerns on the SAAD property. At that time, the geotechnical aspects of the site were not studied because they were not critical to the actions. Significant remedial excavations, however, must consider the geotechnical issues such as slope stability, particularly if such issues could impact adjacent structures. No engineering investigations have been conducted on the CSX railroad embankment.

To that end, we understand that you desire a geotechnical investigation and limited environmental study of the berm adjacent to the proposed SAAD Site excavation. The primary purpose of this work is to address stability of the berm and mainline track during the removal action. Due to the considerable disruptions to rail yard operations caused by such investigations, you wish to obtain as much information as possible about the berm during this effort. Accordingly, soil and ground water samples will be obtained for environmental testing. You expect that the environmental data will contribute to potential future remedial investigations of the area.

To address berm stability issues, the necessary geotechnical study will include a field investigation and laboratory testing program, followed by a series of engineering analyses to assess permissible slope inclinations and/or appropriate retaining systems. The proposed field investigation will include drilling and sampling of the embankment and subgrade. It will also include site surveying. The drilling and sampling program will follow approved environmental protocol such that soil and ground water samples can be obtained for chemical analyses.

PROPOSED WORK PLAN

General

In general, the work plan includes: site preparation; intrusive site sampling and testing; field surveying; laboratory testing; management of investigation-derived wastes; engineering evaluations; and, the preparation of a final engineering report. A Health and Safety Plan will be prepared prior to the start of field work. The field investigation has been designed to gather subsurface data pertaining to the geotechnical and environmental site characteristics. Field work will be performed under Level D personnel protection with provisions for switching to Level C if conditions warrant. Intrusive sampling will be conducted using decontaminated equipment and will follow approved environmental handling procedures. The following sections define each element of the work plan in more detail.

2 8 1001

Health and Safety
Prior to mobilization of any field personnel or equipment to the site, a Health and Safety Plan will be prepared and approved by the Owner. The Health and Safety Plan will be adapted from that followed at the SAAD Site. It will address all necessary training requirements and safety procedures consistent with 29 CFR 1910.120 for all field activities under this Work Plan.

Site Preparation
After the Health and Safety Plan is approved by the Owner, we will mobilize to the site and begin preparing it for our crews and equipment. We understand that CSX will provide full-time flag protection at our schedule throughout the site preparation and field investigation activities. Site preparation will include the construction of appropriate decontamination facilities and identification of site access routes. We anticipate that all site access and work activities will be confined to CSX property. Thereafter, we will begin clearing and disposing of surface vegetation on the berm slope in the locations of the borings.

Vegetation will be removed by cutting and chipping and debris will be loaded and hauled off-site for disposal. We presume that this material is non-hazardous waste and can be disposed of readily. After clearing the slope areas, we propose to use a rubber-tired Grad-all excavator to prepare a ramp down the outslope to the proposed boring location near the berm toe. We expect that the ramp will be inclined at 3H:1V, or flatter as space permits. The ramp excavation will only involve berm material; the original subgrade soils should not be disturbed by this work. Following the completion of site drilling and sampling, the ramp excavation will be backfilled and graded to return the site to its approximate existing condition.

Drilling and Sampling
We propose to drill a total of five (5) exploratory borings in the approximate locations shown on the sketch included in Attachment 3. One boring will be located near the toe of the berm. The remaining borings will be located on top of the embankment. Three (3) borings will be spaced along the edge of the berm. These borings will extend about 100 feet north and south of the proposed excavation area. The final boring will be located approximately 60 feet from the berm edge on the west side of the mainline tracks. Drilling activities will be performed using an ATV rig.

In order to index the site soils and provide samples for review and fundamental laboratory testing, all of the borings will be sampled in general accordance with ASTM D 1586 (*Standard Penetration Test Split Spoon Sampling*). Within the berm, sampling will be performed on a 5 foot interval to a depth of about 17 feet. Below that depth and extending to refusal, the subgrade will be continuously sampled. In addition, up to 10 Shelby tube samples will be attempted in general accordance with ASTM D 1587 (Thin-Wall Tube Sampling of Soils) in order to provide samples for geotechnical laboratory testing. At Borings 3 and 4 (and possibly at other borings if needed because of unexpectedly shallow refusal) we propose to core 15 feet of bedrock in order to confirm its presence and characteristics. Three borings will be converted to permanent monitoring wells (i.e., Borings 1, 4 and 5); those borings will be advanced using a 4.25-inch I.D. augers. The other borings will be advanced using 3.25-inch I.D. augers. Drive sampling will be performed using a 24-inch long split-spoon sampler. Coring activities will include setting casing and diamond bit coring size NX.

Ground water levels will be a critical factor in evaluating slope stability and shoring options, if shoring is needed. Therefore, we propose to leave all boreholes open for 24-hours to obtain water level readings. In addition, we propose to install 3 ground water observation wells to allow monitoring of ground water levels over time and to obtain samples for analytical testing. Monitoring wells will consist of flush-mounted, 2 inch diameter, stainless-steel screens and risers at Borings 1, 4 and 5.

All drilling, sampling and well installation operations will conform to the decontamination and sample handling protocol described elsewhere herein. We will provide an on-site professional to supervise and monitor the work. Our on-site representative will be responsible for collecting and packaging selected soil and ground water samples for laboratory testing. A summary of estimated drilling and sampling quantities is presented in Table 1. Details pertaining to the soil and ground water sampling program, and the well construction and sampling program are included in Attachment 4.

TABLE 1
SUMMARY OF ESTIMATED FIELD DRILLING AND SAMPLING QUANTITIES

Boring I.D.	Est. Total Drill Depth (LF)	Est. Berm Thickness (LF)	Est. Subgrade Thickness (LF)	Est. Core Interval (LF)	Est. Monitor Well Depth (LF)	No. 3-Inch Shelby Tube	Est. No. Analytical Test Samples		
							Berm	Sub-grade	Ground Water
1	50	20	30	0	50	2	1	2	1
2 (Toe)	20	0	20	0	0	2	0	2	0
3	65	20	30	15	0	2	1	2	0
4	50	20	30	0	50	2	1	2	1
5	50	20	30	0	50	2	1	2	1
TOTAL	235	80	140	15	150	10	4	10	3

Field Surveying
Unless accurate site mapping is available from another source, we propose to perform a field survey of the study area. The field survey will include both location and topographic surveys. The location survey will identifying pertinent site features such as the rails, borings, wells, etc. The topographic survey will be tailored to characterize surface information over an approximate 200 feet by 450 foot plan area. It will include spot elevations west of the tracks in the area of the Pollution Control Unit and drainage swale south of that unit. Topographic mapping will be produced at a contour interval of one foot and a plan scale of 1-inch equals 10 feet. The field survey work will be performed using an automatic data collector and three person crew.

Mapping produced by the survey will be used as a base plan for displaying the borings and other pertinent features including profile and section limits. Additional drawings will be generated which show cross-sectional and subsurface data in graphic form.

Sample/Material Handling and Disposal Protocol
Sample and material handling procedures are outlined in Attachment 4 along with disposal requirements for investigation-derived wastes. In short, soil and ground water samples will be obtained and packaged in accordance with approved criteria. Following the completion of field drilling and sampling activities, materials generated and not submitted for testing will be temporarily stockpiled on-site and covered with plastic. Based on the analytical test results, stored materials will be appropriately disposed.

Decontamination Program
All site activities associated with intrusive sampling will be subject to stringent equipment and materials decontamination procedures. In general, the program will involve construction of the decontamination area and specific criteria for decontamination of sampling rigs, equipment and materials. Details of the decontamination program are provided in Attachment 5.

Geotechnical Laboratory Testing
To assess the engineering characteristics of the soil and rock materials, the geotechnical testing program must identify the material type(s) and their respective properties. Initially, the program will include tests to classify the soil samples according to plasticity characteristics, natural moisture content, and grain size distribution. Engineering characteristics of the in-situ soil and rock will be assessed by testing or estimating their respective shear strength, consolidation characteristics, and hydraulic conductivity.

Specifically, to classify the site soils, selected samples of each soil type encountered during drilling will be tested to determine plasticity characteristics (Atterberg Limits; ASTM D 4318, Liquid Limit, Plastic Limit, and Plasticity Index of Soil), particle size distribution (ASTM D 422, Particle Size Analysis), and natural moisture content

2 6 1501

(ASTM D 2216, Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures). The engineering characteristics of appropriate site materials will be assessed by testing the soil's compressive strength and consolidation characteristics (ASTM D 4767, Triaxial, Consolidated Undrained Compressive Strength and ASTM D 2166, Unconsolidated, Undrained, Unconfined Compressive Strength). Selected soil samples will also be tested to estimate hydraulic conductivity (EPA Method 9100, Saturated Hydraulic Conductivity). Table 2 summarizes the expected geotechnical testing program.

TABLE 2
ANTICIPATED GEOTECHNICAL LABORATORY TESTING PROGRAM

Test	Method	No. of Tests on Berm Material	No. of Tests on Subsoil	No. of Tests on Bedrock
Liquid Limit, Plastic Limit, and Plasticity Index	ASTM D-4318	2	2	N/A
Particle Size Analysis	ASTM D-422	1	1	N/A
Natural Moisture Content	ASTM D-2216	5	5	N/A
Triaxial, CU Compressive Strength	ASTM D-4767	0	1	0
Unconfined, Compressive Strength	ASTM D 2166	1	1	1
Saturated Hydraulic Conductivity	EPA Method 9100	0	1	0

One predominant soil type (i.e., residuum), in addition to the railroad berm material, is expected at the site. However, the possibility exists that more than one type of soil is present within both the embankment and subsoils. If several significantly different soil types are found during the exploration, some modification to the laboratory testing program may be required. Moreover, we assume that the geotechnical testing will be performed coincident with the analytical testing program. As such, we must assume that all geotechnical test samples will be handled under Level C PPE.

Analytical Laboratory Testing

Selected soil and ground water samples recovered during field sampling and screening will be packaged and shipped to Analytical Technologies, Inc., Pensacola, Florida for chemical analysis. The analytical program will include the following tests:

A. Total Chromatographable Organics (Modified 8015)
B. RCRA Metals (Totals)
C. PCBs (Methods 8080 and 608)
D. VOCs (Methods 8240 and 624) including the Tentatively Identified Compound List (TIC)

We estimate that 15 soil and 10 water samples will be tested. Water samples will include ground water, decontamination fluids and drill fluids. Table 3 summarizes the expected soil and water/fluids test types and quantities.

TABLE 3
ANTICIPATED ANALYTICAL TESTING PROGRAM

Sample Type	No. Total Samples Taken	No. Analytical Testing Program					
		TCOs Modified 8015	RCRA Metals (Totals)	PCBs Soil Method 8080	PCBs Water Method 608	VOCs Method 8420 and 624	TIC List
Soil from Berm	4	4	4	4	0	4	4
Subgrade Soils	10	10	10	10	0	10	10
Ground Water	3	3	3	0	3	3	3
Field Blank	2	2	2	0	2	2	0
Duplicates	2	2	2	1	1	2	0
Trip Blank (One per Cooler)	3	0	0	0	0	3	0
Drill Fluids	1	1	1	0	1	1	1
TOTALS	25	22	22	15	7	25	18

All analytical laboratory analyses will be performed in accordance with Data Quality Objectives Level III laboratory QA\QC requirements. Data will be retained for future validation should that be warranted.

Geotechnical Engineering Evaluation

Geotechnical data from the field exploration, surveying, and laboratory testing program will be used to model site conditions and analyze the berm out-slope. The geotechnical engineering study will include slope stability analyses of likely excavation geometries in order to predict a maximum allowable slope inclination during the adjacent removal action. The analyses will use a minimum factor of safety of 1.5 against failure under both short term (total stress) and long term (effective stress) scenarios. The study will focus on protection of railroad facilities and operations. It is not intended to be applicable to safety issues or other matters relating to the adjacent excavation. If the study shows that slope retaining systems are required or recommended, we will provide appropriate design parameters and schematic diagrams illustrating potential excavation support systems. The design of specific support systems is beyond the scope of this work plan.

Engineering Report
After the field work, laboratory testing, and engineering evaluations are completed, a report will be prepared and submitted describing the project. The report will include a description of the engineering program along with recommendations for permissible slope inclinations, benching, ground water control, and retaining system design parameters, if appropriate. The report will include, but will not necessarily be limited to, a discussion of the following items:

1. The overall site evaluation program, including field, laboratory and engineering activities;

2. The presence or absence of fill, bedrock, and ground water at the boring locations, including the nature and consistency of the soils encountered;

3. General comments on the geology of the site;

4. Recommendations for maximum slope inclinations using a minimum factor of safety of 1.5 against failure under total stress and effective stress, static and surcharge conditions;

5. Recommendations for suitable types of retaining systems, if necessary, including geotechnical criteria for the design of such retaining systems; and,

6. Other geotechnical criteria that is pertinent to the project.

In addition to the information described above, the report will include a presentation of all laboratory test data, including the analytical test results. The environmental data will be presented only; no assessment of the data will be provided.

SCHEDULE
We are available to begin work immediately upon receipt of your authorization or notice-to-proceed (NTP). Preparation and issuance of our Health and Safety Plan will require several days to complete. We should be ready to mobilize to the site within about 10 calendar days of NTP. The field investigation will likely require about two weeks; field surveying will be performed coincident with drilling activities. After drilling is completed, laboratory testing will be initiated. We estimate that the testing program will require about four weeks. Our engineering analyses, evaluations and report preparation will require about two weeks following the completion of testing. In summary, we estimate that our final report will be available about 10 weeks after NTP.

CLOSURE

We trust that the above work plan and implementation schedule meet your project objectives. As noted previously, our cost proposal for this program is provided under separate cover.

We appreciate this opportunity to propose our services to CSX Transportation. If you have any questions or comments regarding this information, please call at your convenience.

Respectfully submitted,

Ogden Environmental & Energy Services, Co.

Bernard H. Voor III

Bernard H. Voor, III, P.E.

Attachments

2 6 1503

ATTACHMENT 1

ASFE INFORMATION CIRCULAR

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING PROPOSAL

As the client of a consulting geotechnical engineer, you should know that site subsurface conditions cause more construction problems than any other factor. ASFE/The Association of Engineering Firms Practicing in the Geosciences offers the following suggestions and observations to help you manage your risks.

HAVE REALISTIC EXPECTATIONS

If you have not dealt with geotechnical issues before, recognize that site exploration identifies actual subsurface conditions only at those points where samples are taken, at the time they are taken. The data derived are extrapolated by consulting geotechnical engineers who then apply their judgment to render an opinion about overall subsurface conditions, how they will react to construction activity, and appropriate design of foundations, slopes, impoundments, and other construction elements. Even under optimal circumstances, actual subsurface conditions may differ from those inferred to exist, because no geotechnical engineer, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock, and time.

DEVELOP THE SUBSURFACE EXPLORATION PLAN WITH CARE

The nature of a subsurface exploration program — the types, quantities, and locations of procedures used — plays a large role in determining the effectiveness of a geotechnical engineering report and the design based upon it. The more comprehensive a subsurface exploration plan, the more information it provides to the geotechnical engineer, helping the engineer reduce the risk of unanticipated conditions and the attendant risk of costly delays and disputes. Even the cost of subsurface construction may be lowered.

Geotechnical design begins with development of the subsurface exploration plan, a task that should be accomplished jointly by you and/or your professional representatives and the geotechnical engineer. Mutual development helps assure that all parties involved recognize one another's concerns and the available technical options. Clients who develop a subsurface exploration plan without the involvement of their geotechnical engineers may be required to assume responsibility — and liability — for the plan's adequacy.

READ GENERAL CONDITIONS CAREFULLY

Most consulting geotechnical engineers include their standard general contract conditions in their proposals, and it is common for one of these conditions to limit the engineer's liability. Known as risk allocation or limitation of liability, this approach helps prevent problems to begin with, and establishes a fair and reasonable framework for handling them should they arise.

Various other elements of the general conditions explain the geotechnical engineer's responsibilities, in order to help prevent confusion and misunderstandings, and assist all parties in recognizing who is responsible for different tasks.

In all cases, read the geotechnical engineer's general conditions carefully. Speak with the geotechnical engineer about any questions you may have.

HAVE THE GEOTECHNICAL ENGINEER WORK WITH OTHER DESIGN PROFESSIONALS

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a geotechnical engineering report. To help avoid misinterpretations, retain your geotechnical engineer to work with other project design professionals who are affected by the geotechnical report. Ask the geotechnical engineer to explain report implications to those design professionals affected by them, and to review other design professionals' plans and specifications to consider the manner in which they have incorporated geotechnical issues. Although other design professionals may be familiar with geotechnical concerns, none knows as much about them as a competent geotechnical engineer.

REALIZE THAT ENVIRONMENTAL ISSUES HAVE NOT BEEN ADDRESSED

If you have requested a geotechnical engineering proposal, it will not include services needed to evaluate the likelihood of the site being contaminated by hazardous materials or other pollutants. Given the liabilities involved, it is prudent practice always to have a site reviewed from an environmental viewpoint. A geotechnical engineer cannot be responsible for failing to detect contaminants when the services needed to perform that function are not being provided.

OBTAIN CONSTRUCTION OBSERVATION SERVICES

Most experienced clients retain their geotechnical engineers to serve throughout the project's development. Involvement during the construction phase is particularly important, because it permits the geotechnical engineer to be on hand promptly to evaluate unanticipated conditions, to conduct additional tests if required, and — when necessary — to recommend solutions to problems. In addition, the geotechnical engineer can monitor the geotechnical-related work performed by contractors. It is essential to recognize that the construction recommendations included in a geotechnical engineer's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site.

Because actual subsurface conditions can be discerned only during earthwork, geotechnical engineers need to observe those conditions in order to finalize their recommendations. Only the geotechnical engineer who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations are valid. The geotechnical engineer submitting the report cannot assume responsibility or liability for the adequacy of preliminary recommendations if another party is retained to observe construction.

RELY ON YOUR GEOTECHNICAL ENGINEER FOR ADDITIONAL ASSISTANCE

Most geotechnical engineers who are members of ASFE are familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a construction project, from design through construction. Speak with your geotechnical engineer not only about geotechnical issues, but others as well, to learn about approaches that may be of genuine benefit. You may also wish to obtain certain ASFE publications. Contact an ASFE member or ASFE itself for a complimentary directory of ASFE publications.

ASFE THE ASSOCIATION OF ENGINEERING FIRMS PRACTICING IN THE GEOSCIENCES

8811 COLESVILLE ROAD/SUITE G106/SILVER SPRING, MD 20910
TELEPHONE: 301/565-2733 FACSIMILE: 301/589-2017

BPC0592B/3.5M

ATTACHMENT 2

BACKGROUND INFORMATION ABOUT THE SAAD TROUSDALE DRIVE SITE

(Information Obtained from
Request for Proposal, dated
18 May 1994, by WESTON,
Louisville, Kentucky)

SECTION 2

Background Information

2.0 General

The SAAD Trousdale Drive Site is located in Nashville, Davidson County, Tennessee and is the location of a former waste oil recycling service, which began operation in 1970. The service came under scrutiny in 1978 when the Tennessee Department of Public Health (TDPH) discovered a depression on the SAAD Property containing waste material. The State of Tennessee issued a court order to the Saads mandating that they pump and backfill the depression. The Saads used boulders and gravel to backfill the depression, which did not satisfy the state since retrievable sludges were left on site. In 1979, the TDPH discovered drums suspected of containing hazardous waste present on the site.

The EPA issued an order to the Saads in 1980 enjoining them from bringing any liquid waste onto the site without permission from the Tennessee Department of Health and Environment (TDHE). After a geophysical and sampling investigation by the EPA Field Investigation Team (FIT) contractors and a preliminary assessment/site inspection by the TAT, the EPA issued an Administrative Order to the Saads in November 1989. Consequently, all identified responsible parties formed the SAAD Site Steering Committee (Committee) in January 1990.

The Committee procured Ensite, Inc. to conduct the initial phase of the cleanup, which involved the removal of all surface equipment and the associated contents. This phase resulted in the removal of four aboveground tanks, two sumps and their associated contents along with contents of the oil/water separator system. A total of 144,700 pounds of characteristically hazardous waste was treated off site via incineration and 16,300 gallons of treated, nonhazardous wastewater were shipped off site for disposal. The equipment was decontaminated and shipped off site for recycling.

In April 1990, the Committee entered into an Administrative Order by Consent (AOC) with the EPA and procured EMPE, Inc. to collect surface soil samples from across the site and conduct a trenching investigation of the depression on the southwest corner of the site. The surface soil samples indicated the presence of total petroleum hydrocarbons, while the trenching samples passed TCLP analysis. The boundaries of the depression were delineated; however, no discreet sludge layers were identified.

A supplemental Removal Action/Field Investigation (RA/FI) Work Plan was developed on behalf of the Committee to address the remaining issues of the AOC. This plan was approved by the EPA and implemented in August 1991. In accordance with the plan, all surface and subsurface materials and equipment associated with past site evaluations and operations were removed. One hundred twenty two drums of waste were containerized for offsite disposal. Sixteen were classified as hazardous and disposed accordingly, while the remaining 106 drums were disposed as nonhazardous waste at a licensed waste disposal facility. Sixty cubic yards of construction debris were removed from the site as well as 40 cubic yards of nonhazardous miscellaneous debris. Approximately 8,500 gallons of nonhazardous liquids were removed from the site and disposed at a licensed waste treatment facility. All subsurface equipment associated with the oil/water separator system were excavated, cleaned and cut as necessary for offsite metal recycling. A 30 feet by 20 feet by 13 feet excavation was created.

In an effort to delineate the nature and extent of subsurface contamination, a total of seven borings to bedrock and over 100 feet of trench to a maximum depth of twenty feet were performed for a site soils evaluation. This evaluation determined that there is a significant amount of debris fill from the surface to approximately thirteen feet below ground with contamination extending to the soil/bedrock interface, approximately twenty feet below ground. Liquid and solid oil-stained materials were observed in borings and trenches, and water with an oil sheen was observed within cavities created by debris fill in the vadose zone. Buried drums containing hazardous constituents were encountered, removed, sampled and overpacked for disposal. A concrete pad of variable thickness was discovered and was traced at variable depths in the subsurface from the Franklin Brick property onto the Saad property. This subsurface investigation further indicated that the settling basin area is not a geologic sinkhole or collapse feature based on bedrock depths over the site, bedrock structural relief and an analysis of historic aerial photographs (refer to Attachment IV for trench, borehole, and sampling locations). A geophysical study was also conducted at this time and is provided in Attachment V.

The report detailing the results of the removal action, (RA/FI Report, DRE Technologies, January 1992) concluded that all of the equipment and materials associated with a previous NPL scoring, which indicated a potential risk with direct contact, have been removed from the site. Soil sampling results indicated that site soil contamination is primarily limited to ethylbenzene, toluene, xylene and trichloroethene (refer to Attachment IV for a site map with sample locations and results). The detection of these compounds above the action levels set for the site is limited to four samples, all located on the southwest portion of the site.

Phase II of the removal action was initiated on 02 October 1992 under an AOC with the EPA dated 12 August 1992. The SAAD Site RA/FI Phase II Report developed by DRE Technologies, dated April 1993, documents that this phase of the removal included additional trenching, soil sampling, soil removal, drum removal and disposal (refer to Attachment VI for trench, borehole, and sampling locations). The sampling indicated that Total Recoverable Petroleum Hydrocarbons (TRPH) were the most widespread site contaminant. Laboratory analysis and field analysis did not reveal levels of PCBs above the TRL of 10 ppm. Lead contaminated soils were discovered in the vicinity of the oil/water separator and 40 cubic yards of soil were excavated and transported off site for disposal.

The SAAD Site is a 0.4 acre parcel of property owned by Mr. and Mrs. Ellis Saad and leased to LTD Body Shop, an automotive body repair shop. The site is located in a highly industrial area of Nashville and is bounded by active businesses.

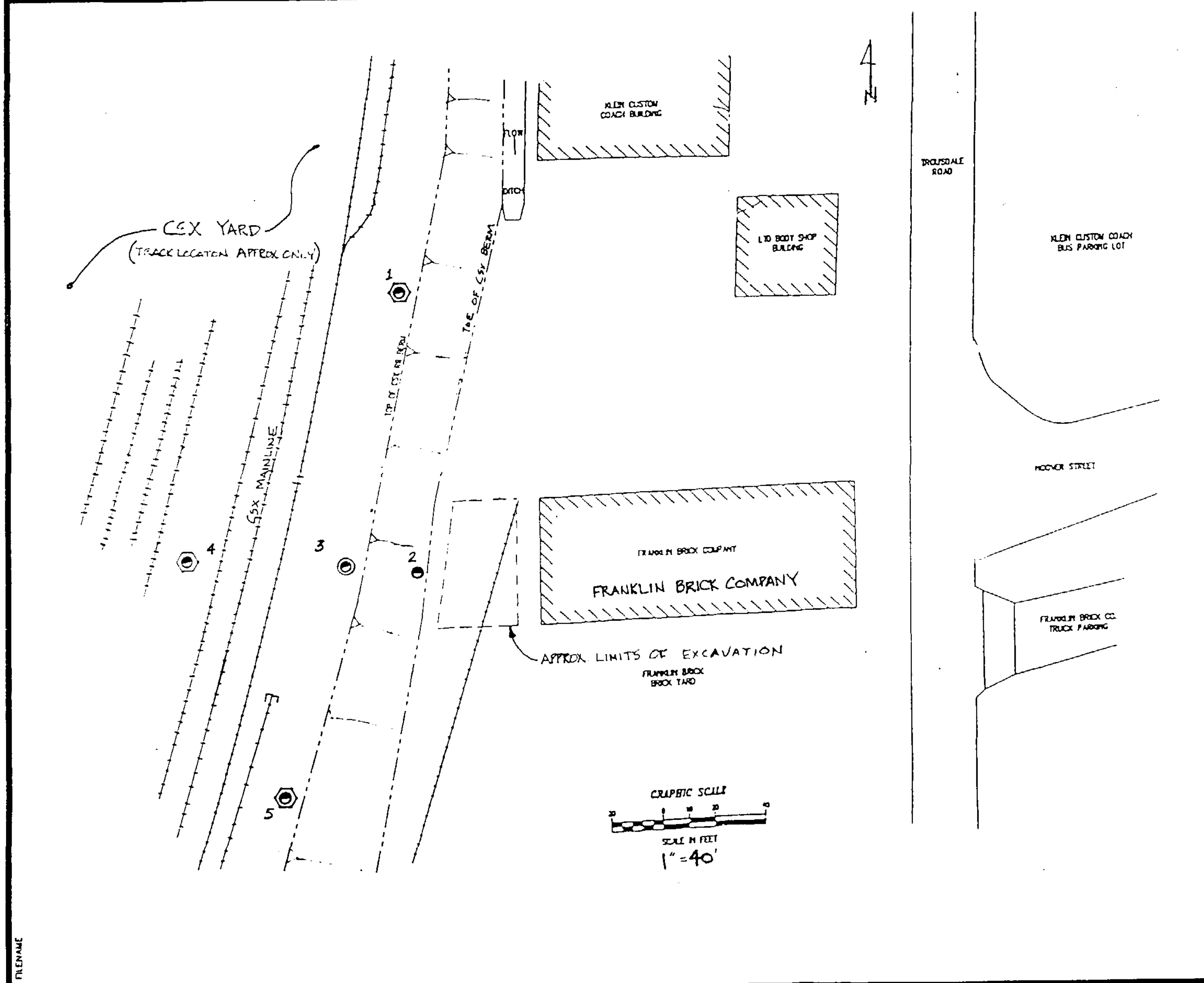
The site is situated at an elevation of 589 feet above mean sea level and is relatively flat with less than two feet of elevation variation. The surface of the site is covered with densely compacted fill, consisting of trees, slabs of concrete and boulders. However, the general area primarily consists of undulating to rolling, well drained soils, and industrial and urban land. The property lies on the Maury-Urban Land-Armour soils area.

The site is located in the outer basin of the Central Basin physiographic province of Tennessee. This area is characterized by mature rolling hills that have resulted from erosion by surface waters as they drain toward the Cumberland River. The site is underlain by the upper Ordovician Bigby-Cannon Limestone. The Bigby Limestone is a medium light gray to brownish-gray, coarse-grained medium bedded calcarenite and does weather to form sinkholes in places.

Surface water drains in two direction from the site due to gentle sloping. The western portion of the site drains toward the ditch located at the base of the steep bank below the railroad. The eastern portion of the site drains in sheet runoff toward Trousdale Drive. A small, depressed area is located near the center of the property. During storm events, a small amount of rainwater remains standing in the center of the site. Runoff from the site generally appears to flow toward Seven Mile Creek.

ATTACHMENT 3

PROPOSED BORING LOCATION PLAN FOR CSX BERM INVESTIGATION



NOTES

1) PLAN ADAPTED FROM DRAWING BY D.R.E. ENVIRON. SERVICES

LEGEND

- DRIVE-SAMPLED HOLE
- DRIVE-SAMPLED AND CORED HOLE
- CONVERT BORING TO MONITERING WELL

DATE	REVISIONS	BY

CSX RADNOR YARD, NASHVILLE TN.
GEOTECHNICAL STUDY-BERM STABILITY

PROPOSED BORING PLAN

SCALE: APPROX. 1" = 40' | DR DJH | CHK | REV

PREPARED FOR:
CSX TRANSPORTATION

PREPARED BY:
OGDEN ENVIRONMENTAL AND ENERGY SERVICES
3325 PERIMETER HILL DRIVE • NASHVILLE, TN 37211 • 615-333-0630

PROJ: 4-9999-7171 | DATE: 7-29-94 | SHEET 1 OF 1

ATTACHMENT 4

MEDIA SAMPLING AND WELL CONSTRUCTION DETAILS AND PROTOCOL

SOIL SAMPLING

Soil samples will be collected using a 24-inch long split-spoon sampler advanced through hollow stem augers. Samples of the berm material will be recovered in Borings 1, 3, 4 and 5. The sample for each boring with the highest OVA reading or with the most pronounced visible indications of contamination will be retained for analytical testing. In the absence of any apparent contamination, the test samples will be selected from a zone of relatively high permeability based on visual examination. The site representative may exercise his judgement and collect multiple samples if conditions warrant.

Below the berm material, split-spoon sampling will be performed continuously to refusal in all borings. Similar to the manner described above, all samples will be field screened using an OVA instrument and visually inspected to identify two samples from each boring for analytical testing. In general, sample selection will be based on the OVA results, however, the targeted sample selection zones for the subsoils include the vadose zone, the water table surface, and the soil/bedrock interface.

All soil samples identified for testing will be placed in two, eight-ounce glass jars with Teflon lids and cooled to 4°C. A table of recommended sample containers, preservation techniques and holding times is provided at the end of this section. Also provided therein is information pertaining to recommended sample volumes.

MONITORING WELLS

Monitoring wells will be installed in Borings 1, 4 and 5. The well tips will be located at the approximate soil/bedrock interface. The wells will be flush-mounted, two-inch diameter, stainless steel units including a ten foot factory slotted screen, riser pipe, and end caps. The annular space around the screen, and extending two feet above the top of the screen, will be backfilled with clean, uniform sand. A two foot thick bentonite seal will be placed above the sand. The balance of the boring annulus will be grouted. A concrete pad with a brass marker will be placed around the top of the casing flush with the ground surface and the well will be fitted with a locking cap. Typical well diagrams are provided at the end of this section.

RECORDS

A written record of construction detailing the timing, amount of materials, and methods of installation/construction for each step of monitoring well construction will be prepared during the work by the field representative. An "as-built" detail of each well will be prepared. A typical well completion record form is included herein.

WELL DEVELOPMENT

Each well will be developed no sooner than 24-hours after completion of well installation to allow the annular seal to fully set up. Well development will likely be performed by surging with a bailer and/or hand-operated surge block or by pumping with a bladder pump. Well development will comply with applicable state criteria.

During development, samples will be collected on a regular basis and analyzed in the field for temperature, pH, and specific conductivity. These parameters are measured to demonstrate that the natural character of the formation waters has been restored. Stability will be considered to have demonstrated when the field parameter measurements stabilize within 10 percent.

WELL PURGING AND SAMPLING

Ground water sampling from the constructed and developed wells will consist of the following: 1) measurement of depth to ground water and well depth; 2) assessment of the presence/absence of an immiscible phase; 3) calculation of the purge volume; 4) purging of static water within the well and well bore; and 5) obtaining a ground water sample. Additional steps may be necessary, depending upon specific field conditions. In general, well sampling will not be conducted in conjunction with well development. Prior to sampling, the well will be purged to ensure that all stagnant water is replaced by fresh formation water. The approach taken during well purging should allow drawdown of the water level within the well, but should not completely evacuate the well. Excessive drawdown could enhance the volatization of volatile organic constituents (VOCs) as water within the well cascades through the filter pack.

If feasible, each well will have at least three well casing volumes of water removed during the purging procedure. The purging methodology selected should not aerate the water within the well during or after the purging process. Wells that may be particularly problematic are low yield wells that can be easily evacuated to dryness.

In high yield formations, purging will remove water from the entire screened interval of the well to ensure that fresh water from the formation is present throughout the entire saturated interval. This may require gradual movement of the pump from the lower to the upper sections of the screened interval. Water should be purged from the bottom portion of the screened interval within low yield wells and the water level should not drop below approximately 25 percent of the original height of the water column. During the well purging procedure, water level and/or product level measurements will be collected to assess the hydraulic effects of purging.

Water samples will be collected on a regular basis during well evacuation and analyzed in the field for temperature, pH, and specific conductivity. These parameters are measured to demonstrate that the natural character of the formation waters has been restored. Stability will be considered to have demonstrated when the field parameter measurements stabilize within 10 percent.

Each well will be sampled after it has recovered to at least 90 percent of its original water column height or after 1 hour, whichever comes first. A water level will be recorded prior to sampling to demonstrate the degree of recovery of the well. Sampling equipment (e.g., especially bailers) should never be dropped into the well, because this could cause aeration of the water upon impact. Additionally, the sampling methodology utilized should allow for the collection of a ground water sample in as undisturbed a condition as possible.

Sampling equipment will be constructed of inert material. Equipment with neoprene fittings, PVC bailers, tygon tubing, silicon rubber bladders, neoprene impellers, polyethylene, and viton is not acceptable. If bailers are used, an inert cable/chain (e.g., fluorocarbon resin-coated wire or single strand stainless steel wire) will be used to raiser and lower the bailer. Generally, both bailers and bladder pumps are acceptable sampling devices for all analytical parameters.

Ground water samples will generally be collected and placed in their proper containers in the order of decreasing volatility and increasing stability. A preferred collection order for some common ground water parameters is:

- Volatile organic constituents (VOCs);
- Purgeable organic carbon (POC);
- Purgeable organics halogens (POX);
- Total organic halogens (TOX);
- Total organic carbon (TOC);
- Extractable organics;
- Total metals;
- Dissolved metals;
- Phenols;
- Cyanide;
- Sulfate and chloride;
- Turbidity;
- Nitrate and ammonia; and
- Radionuclides.

When sampling for VOCs, water samples will be collected in vials or containers specifically designed to prevent loss of VOCs from the sample. These vials will be provided by an analytical laboratory. Ground water from the sampling device will be collected in vials by allowing the ground water to slowly flow along the sides of the vial. The vial will be filled above the top of the vial to form a positive meniscus with no overflow. No headspace will be present in the sample container once the container has been capped.

Samples requiring analysis for organics will not be filtered. Samples will not be transferred from one container to another as losses of organic material onto the walls of the container or aeration could occur.

Ground water samples to be analyzed for metals will be split into two portions. One portion will be filtered through a 0.45-micron membrane filter, transferred to a container, preserved with nitric acid to a pH less than 2 and analyzed for dissolved metals. The remaining portion will be transferred to a container, preserved with nitric acid, and analyzed for total metals. Any difference in concentration between the total and dissolved fractions may be attributed to the original metallic ion content of the particles and adsorption of ions onto the particles.

SAMPLING LABELING AND CHAIN-OF-CUSTODY

Soil, ground water, and fluid samples will be labeled using the following nomenclature:

PPP-MM-T##-D###

Where: PPP is the project designation, "CSX"
MM is the media designation;
"GW" - ground water
"SS" - soil sample
"OM" - other media
"ER" - equipment rinsate
"TB" - trip blank
"FD" - field duplicate

T## is the location type and number;
"B" - boring
"W" - well
"R" - surface

D### is the sample depth in feet below ground surface if applicable.

An example of this labeling system is CSX-SS-B4-D12.5, which represents a sample from the CSX project, soil media, from Boring 4, at a depth of 12.5 feet.

The above sample designation system will be used consistently in the field representative's log book, chain-of-custody forms, and the analytical laboratory's Certificates of Analysis. If any other types of media (OM) are collected, their designations will be entered in the log book and noted on the chain-of-custody form. A sample of chain-of-custody form is included at the end of this section.

INVESTIGATION-DERIVED WASTES

During drilling, sampling, well development, well purging and decontamination activities, recovered soil and fluids will be temporarily stored in bulk on-site. Storage of soil cuttings/samples will be on plastic with a plastic cover. Storage of fluids will be in a bulk container. After the completion of the field activities, all investigation-derived wastes will be moved to a central area for temporary storage. When the analytical test results become available, the material will be disposed of properly as a non-waste, a special waste, or a hazardous waste. If testing shows that materials are clean or that contaminants do not exceed applicable action levels, the materials will be returned to the respective drill locations and spread on the adjoining ground surface. If data shows that samples exceed action levels, the materials will be transported off-site for disposal at an appropriately licensed facility.

Disposable safety and sampling equipment will be containerized at the time it is removed. Separate containers will be provided for the equipment discarded each day.

Disposal requirements will be based on the analytical results from all samples collected during that day's activities.

At the conclusion of the project, the decontamination facility will itself be decontaminated as appropriate and the resultant wastes containerized. The decontamination facility will then be disassembled or demolished. The associated construction materials (e.g., concrete) will be handled as demolition debris. Decontaminated liner materials will be disposed of as a solid waste. Only if decontamination of such materials is impractical, will other disposal alternatives be evaluated.

TABLE 2-3
REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES*

Name	Container[1]	Preservation	Maximum holding time
Bacterial Tests:			
Coliform, fecal and total	P, G	Cool, 4°C, 0.008% $Na_2S_2O_3$	6 hours
Fecal streptococci	P, G	Cool, 4°C, 0.008% $Na_2S_2O_3$	6 hours
Inorganic Tests:			
Acidity	P, G	Cool, 4°C	14 days
Alkalinity	P, G	Cool, 4°C	14 days
Ammonia	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Biochemical oxygen demand	P, G	Cool, 4°C	48 hours
Bromide	P, G	None required	28 days
Biochemical oxygen demand carbonaceous	P, G	Cool, 4°C	48 hours
Chemical oxygen demand	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Chloride	P, G	None required	28 days
Chloride, total residual	P, G	None required	Analyze immediately
Color	P, G	Cool, 4°C	48 hours
Cyanide, total and amenable to chlorination	P, G	Cool, 4°C, NaOH to pH>12, 0.6 ascorbic acid	14 days
Fluoride	P	None required	28 days
Hardness	P, G	HNO_3 to pH<2, H_2SO_4 to pH<2	6 months
Hydrogen ion (pH)	P, G	None required	28 days
Kjeldahl and organic nitrogen	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Metals			
Chromium VI	P, G	Cool, 4°C	24 hours
Mercury	P, G	HNO_3 to pH<2	28 days
Metals, except chromium VI and mercury	P, G	HNO_3 to pH<2	6 months
Nitrate	P, G	Cool, 4°C	48 hours
Nitrate-nitrate	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Nitrite	P, G	Cool, 4°C	48 hours
Oil and grease	G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Organic carbon	P, G	Cool, 4°C, HCI or H_2SO_4 to pH<2	28 days
Orthophosphate	P, G	Filter immediately, cool, 4°C	48 hours
Oxygen, Dissolved Probe	G Bottle and top	None required	Analyze immediately
Winkler	do	Fix on site and store in dark	8 hours
Phenols	G only	Cool, 4°C, H_2SO_4 to pH<2	28 days
Phosphorus (elemental)	G	Cool, 4°C	48 hours
Phosphorus, total	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Residue, total	P, G	Cool, 4°C	7 days
Residue, Filterable	P, G	Cool, 4°C	7 days
Residue, Nonfilterable (TSS)	P, G	Cool, 4°C	7 days
Residue, Settleable	P, G	Cool, 4°C	48 hours
Residue, volatile	P, G	Cool, 4°C	7 days
Silica	P	Cool, 4°C	28 days
Specific conductance	P, G	Cool, 4°C	28 days

* EPA SW846, September 1986

TABLE 2-3 (Continued)
REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES*

Name	Container[1]	Preservation	Maximum holding time
Sulfate	P, G	Cool, 4°C	28 days
Sulfide	P, G	Cool, 4°C, add zinc acetate plus sodium hydroxide to pH>9	7 days
Sulfite	P, G	None required	Analyze immediately
Surfactants	P, G	Cool, 4°C	48 hours
Temperature	P, G	None required	Analyze immediately
Turbidity	P, G	Cool, 4°	48 hours
<u>Organic Tests:</u>			
Purgeable Halocarbons	G,Teflon-lined septum	Cool, 4°C, 0.008% $Na_2S_2O_3$	14 days
Purgeable aromatic hydrocarbons	G,Teflon-lined septum	Cool, 4°C, 0.008% $Na_2S_2O_3$, HCI to pH2	14 days
Acrolein and acrylonitrile	G,Teflon-lined septum	Cool, 4°C, 0.008% $Na_2S_2O_3$, Adjust pH to 4-5	14 days
Phenols	G,Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$	7 days until extraction, 40 days after extraction
Benzidines	G,Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$	7 days until extraction
Phthalate esters	G,Teflon-lined cap	Cool, 4°C	7 days until extraction 40 days after extraction
Nitrosamines	G,Teflon-lined cap	Cool, 4°C, store in dark, 0.008% $Na_2S_2O_3$	40 days after extraction
PCBs, acrylonitrile	G,Teflon-lined cap	Cool, 4°C	40 days after extraction
Nitroaromatics and isophorone	G,Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$ store in dark	40 days after extraction
Haloethers	G,Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$	40 days after extraction
Chlorinated hydrocarbons	G,Teflon-lined cap	Cool, 4°C	40 days after extraction
TCDD	G,Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$	40 days after extraction
Total organic halogens	G,Teflon-lined cap	Cool, 4°C, H_2SO_4 to pH<2	7 days
<u>Pesticides Tests:</u>			
Pesticides	G,Teflon-lined	Cool, 4°C, pH 5-9	40 days after extraction
<u>Radiological Tests:</u>			
Alpha, beta and radium	P, G	HNO_3 to pH<2	6 months

[1]Polyethylene (P) or Glass (G)

* EPA SW 846, September 1986

TABLE 2-3a
RECOMMENDED COLLECTION VOLUMES FOR METAL DETERMINATIONS*

Measurements	Digestion Vol. Req.[a] (mL)	Collection Volume (mL)[b]	Preservative	Holding Time
Metals (except hexavalent chromium and mercury):				
Total recoverable	100	600	HNO_3 to pH <2	6 mo
Dissolved	100	600	Filter on site: HNO_3 to pH <2	6 mo
Suspended	100	600	Filter on site	6 mo
Total	100	600	HNO_3 to pH <2	6 mo
Chromium VI:	100	400	Cool, 4°C	24 hr
Mercury:				
Total	100	400	HNO_3 to pH <2	28 days
Dissolved	100	400	Filter; HNO_3 to pH <2	28 days

[a]Solid samples must be at least 200 g and usually require no preservation other than storing at 4°C until analyzed.

[b]Either plastic or glass containers may be used.

* EPA SW 846, September 1986

TABLE 2-3b

RECOMMENDED SAMPLE CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES*

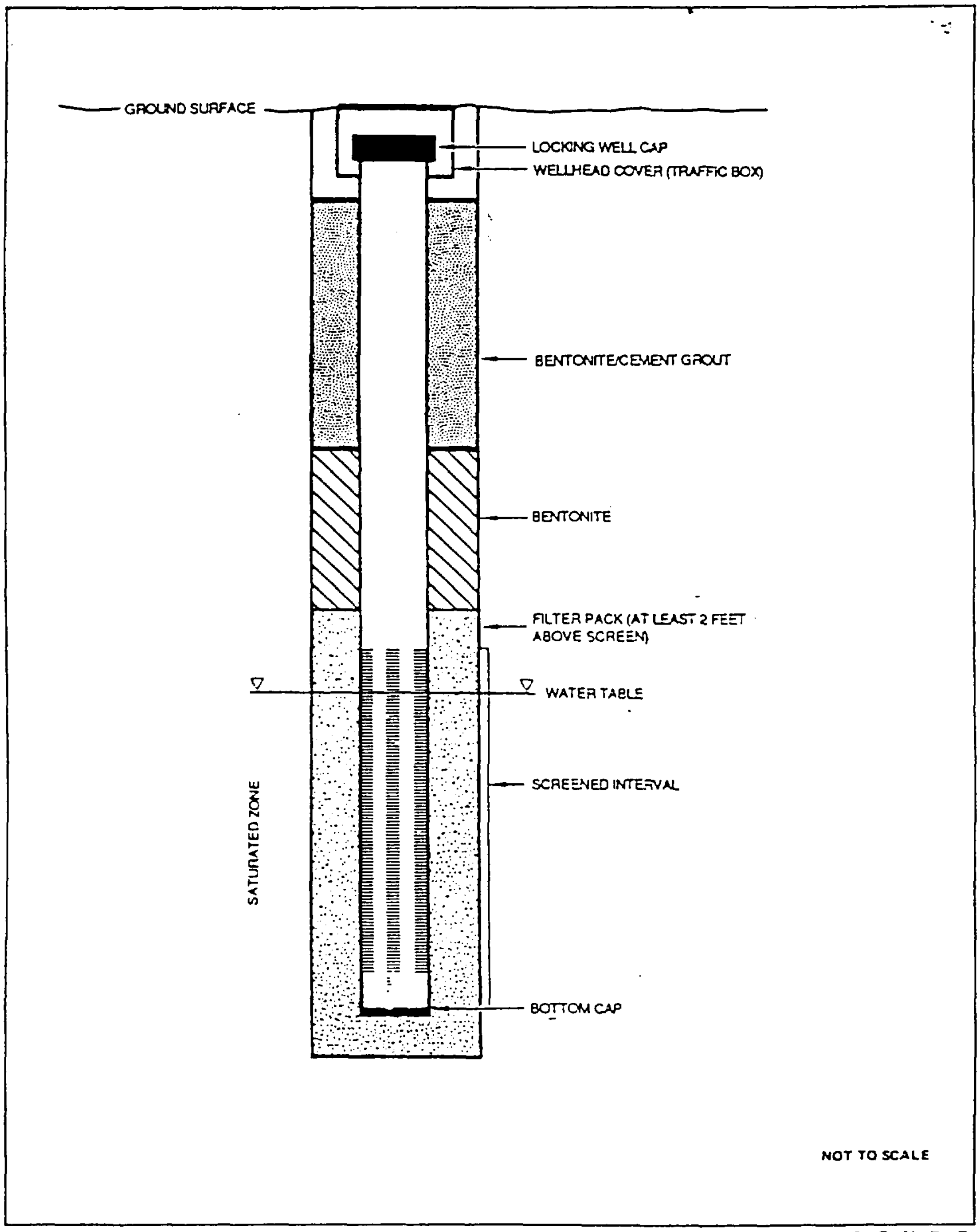
Parameter	Container	Preservative	Holding Time
Volatile Organics			
Concentrated Waste Samples	8-oz. widemouth glass with Teflon liner	None	14 days
Liquid Samples			
No Residual Chlorine Present	2 40-mL vials with Teflon lined septum caps	4 drops conc. HCI, Cool, 4°C	14 days
Residual Chlorine Present	2 40-mL vials with Teflon lined septum caps	Collect sample in a 4 oz. soil VOA container which has been pre-preserved with 4 drops of 10% sodium thiosulfate. Gently mix sample and transfer to a 40-mL VOA vial that has been pre-preserved with 4 drops conc. HCI, Cool to 4°C	14 days
Acrolein and Acrylonitrile	2 40-mL vials with Teflon lined septum caps	Adjust to pH 4-5, Cool, 4°C	14 days
Soil/Sediments and Sludges	4-oz (120-mL) widemouth glass with Teflon liner	Cool, 4°C	14 days

* EPA SW 846, September 1986

TABLE 2-3b (Continued)*

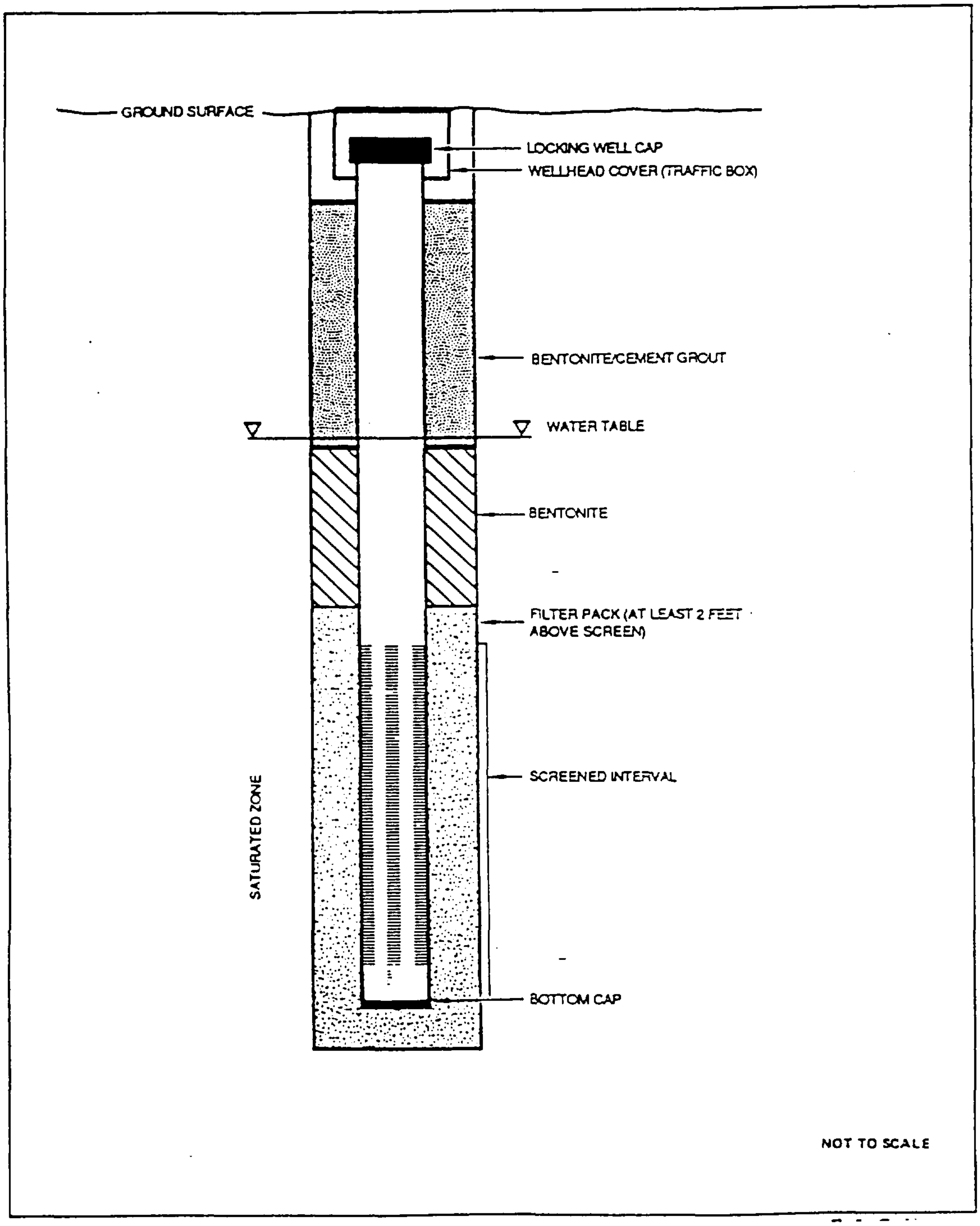
Parameter	Container	Preservative	Holding Time
Semivolatile Organics			
Concentrated Waste Samples	8-oz widemouth glass with Teflon liner	None	14 days
Liquid Samples			
No Residual Chlorine Present	1-gal. or 2 1/2 gal. amber	Cool, 4°C	Samples must be extracted within 7 days and extracts analyzed within 40 days
Residual Chlorine	1-gal. or 2 1/2 gal. amber glass with Teflon liner	Add 3 mL 10% sodium thiosulfate per gallon, Cool, 4°C	Samples must be extracted within 7 days and extracts analyzed within 40 days
Soil/Sediments and Sludges	8-oz. widemouth glass with Teflon liner	Cool, 4°C	14 days

* EPA SW 846, September 1986



General Cross-Section of Monitor Well
Upper Water Bearing Zone

2 8 1 5 ? 9



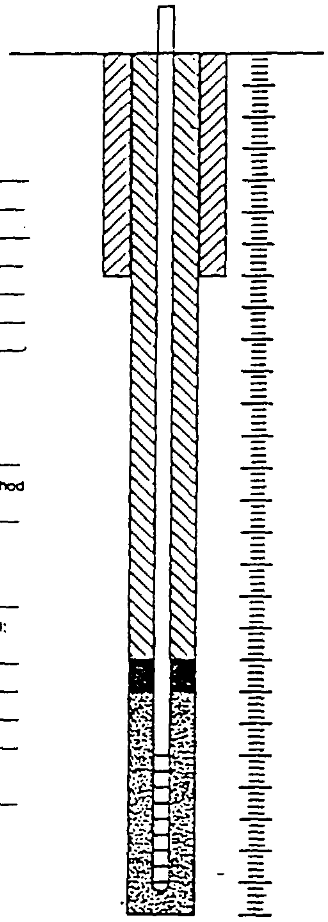
General Monitor Well Cross-Section
Lower Water Bearing Zone

JOB NO. ________________ WELL NO. ________ HYDROGEOLOGIST : ____________________

CLIENT ________________________________ DRILLER ____________________________

WELL LOCATION __________________________ DATE/TIME __________________________

GROUND SURFACE



Well Head Elevation __________

Ground Surface Elev. __________

Well Head Completion Method

___________ __________

Drilling Method/Rig Type

____

Surface Casing: Type ________

Diameter ________

Length ________

DETAILS OF CONSTRUCTION

Date Completed ____________________

Borehole Diameter (in.) ________________

Type and Size of Casing (in.) ______________

Type and Size of Screen (in.) ______________

Screen Perforation Diameter (in.) __________

Screen Length (ft.) ____________________

Centralizer Depths (ft.) ____ ____ ____ ____

Completion Technique:

1) Type of Filter Pack and Placement Method

____

2) Type of Bentonite and Placement Method

____

3) Type of Grout Mixture and Placement Method

____

Description of Potential Problems With Well:

____

____

____

____

Development Technique

____

MATERIALS

Cement (sks.) ______________

Filter Pack Material ($ft.^3$) ________

Casing Material (ft.) __________

Bentonite ($ft.^3$) ______________

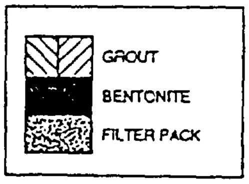
Top of Bentonite Seal ________ft.

Top of Filter Pack ________ft.

Top of Screen __________ft.

Bottom of Screen ________ft.

Bottom of Hole _________ft.



NOTE: ALL DEPTHS ARE REFERENCED TO GROUND SURFACE

Well Completion Record

CHAIN OF CUSTODY

2 8 1531

AnalyticalTechnologies,Inc.
11 EAST OLIVE ROAD PHONE (904) 474-1001
PENSACOLA, FLORIDA 32514

ATI LAB. I.D. # ____________________

PART 1 — Bottle Shipment Information

CLIENT:	CLIENT PROJECT NUMBER:

SAMPLE CONTAINERS SHIPPED

	PRESERVATIVE							PLASTIC CONTAINERS								GLASS CONTAINERS									
QTY.	H_2SO_4	HNO_3	HCl	Zn ACETATE	$Na_2S_2O_3$	UNPRESERVED	NaOH	4 oz.	8 oz.	16 oz.	32 oz.	½ gallon	1 gallon	Whirl-pak	100-ML SPECIMEN CUP	120 ml (A)	120 ml (C)	1 liter (A)	1 liter (C)	40 ml Vial	4 oz. wm	8 oz. wm	16 oz. wm	32 oz. wm	DI Trip Blank

RELINQUISHED	TIME	DATE	RECEIVED	TIME	DATE

PART 2 — Sample Information

PARAMETERS AND PRESERVATIVES

SAMPLE MATRIX

DW DRINKINGWATER
WW WASTEWATER
GW GROUNDWATER
SW SURFACEWATER
SO SOIL
OL OIL
AR AIR
SL SLUDGE

SAMPLE I.D.	DATE	TIME	MATRIX											TOTAL	LAB USE ONLY
TOTAL NUMBER OF BOTTLES/CONTAINERS															

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME

CLIENT ____________________
ADDRESS ____________________
CITY ____________________
STATE __________ ZIP __________
PHONE NO. ( ) ____________________
PROJECT MANAGER (person to receive data)
____

PROJECT NUMBER ____________________
PROJECT NAME ____________________
SAMPLED BY ____________________
SAMPLE SITE ____________________
PURCHASE ORDER NUMBER
____

REQUEST FAX DATA BY __________ (FAX #)
REQUEST VERBAL RESULTS BY ______ (DATE)
NEED DATA PACKAGE BY ________ (DATE)
QUALITY CONTROL REPORTING LEVEL (circle one)
NONE 1 2 3 4
NEED ________ EXTRA COPIES OF REPORT

TURN AROUND TIMES (check one)	SPECIAL INSTRUCTIONS:
STANDARD - 14 TO 21 DAYS ☐	
RUSH: (MUST BE APPROVED IN ADVANCE)	
0-48 HOURS - 2 x STD PRICE ☐	
3-7 DAYS - 1.5 x STD PRICE ☐	
TCLP - 1 WEEK RUSH - 1.5 x STD PRICE ☐	

2 6 1 5 3 2

ATTACHMENT 5

DECONTAMINATION PROGRAM

EQUIPMENT DECONTAMINATION PROGRAM AND PROCEDURES

This section describes procedures for the decontamination of grading, drilling and sampling equipment and materials. Personnel decontamination procedures will be set forth in the site Health and Safety Plan. All drilling and sampling equipment and materials to be used on-site will be decontaminated prior to during, and after the field investigation. All equipment will be inspected prior to, entering the site to ensure that there are no hydraulic leaks and that all gaskets and seals are intact. Any portion of the drill rig that is over the borehole (kelly bar, mast, cathead, etc.) shall be wire brushed and steam cleaned before entering the site to remove all rust, soil, and other foreign material. No oils or grease shall be used to lubricate the borehole or be placed in the borehole. Ogden's on-site field representative will be responsible for program implementation.

Initially, a decontamination area will be constructed on-site. An appropriate location for the decontamination area will be selected based on the ability to control access to the area, control residual material removed from equipment, and store clean equipment. The decontamination area will be located at an adequate distance away and upwind from potential contaminant sources to avoid contamination of clean equipment. Once equipment is cleaned, it will be stored sufficiently far enough away from the potential contamination sources and the decontamination area and in such a manner as to ensure that the equipment remains clean. Decontaminated equipment will be tagged, labeled, or marked with the date cleaned. Sampling equipment in need of repair will be identified with a red tag and stored in a separate area from operable equipment.

The decontamination area will be constructed with a stable flooring that is then covered by a nonporous surface and sloped toward a collection sump. Plastic sheeting and blocks or other objects may be used to create a bermed area for collection of equipment decontamination water. Items such as auger flights that can be placed on stands, saw horses, or other similar equipment, should be situated on this equipment during decontamination to prevent contact with fluids generated by previous equipment decontamination. Decontamination fluids contained within the bermed area will be collected and stored as described below.

Catchment of fluids from the decontamination of lighter-weight drilling equipment and hand-held sampling devices shall be accomplished using wash buckets or tubs. The decontamination fluids shall be collected and stored on-site until its disposition is determined based upon laboratory analytical results. Storage shall be by bulk container.

Decontamination of drilling equipment includes drill rigs, drill bits, auger sections, drill-string tools, drill rods, split barrel samplers, tremie pipes, clamps, hand tools, and steel cable. Decontamination of monitoring well development and ground water sampling equipment includes submersible pumps, bailers, interface probes, water level meters, bladder pumps, air lift pumps, peristaltic pumps, and lysimeters. Other sampling equipment that requires decontamination includes, but is not limited to, hand trowels, shovels, stainless steel spoons and bowls, soil sample liners, wipe sampling templates, and dippers. Equipment with a porous surface, such as rope, cloth hoses, and wooden blocks, cannot be decontaminated and shall be properly disposed after one use.

Down-hole drilling equipment and monitoring well development and purging equipment will be decontaminated prior to initial use, between each borehole or well, and prior to leaving the site. However, down-hole drilling equipment may require more frequent cleaning to prevent cross-contamination between vertical zones within a single borehole. Where drilling through a shallow contaminated zone and installing a surface casing to seal-off the contaminated zone, the drilling tools will be decontaminated prior to drilling deeper. Field work will be initiated by sampling in the location where the least contamination is suspected. All ground water, surface water, and unsaturated zone sampling devices will be decontaminated prior to initial use and between collection of each sample to prevent the possible introduction of contaminants into successive samples.

Equipment and materials will be decontaminated as follows:

1. Clean with tap water and laboratory grade, phosphate-free detergent, using a brush, if necessary, to remove particulate matter and surface films. Steam cleaning and/or high pressure hot water washing may be necessary to remove matter that is difficult to remove with the brush. Hollow-stem augers, drill rods, sample tubes, etc. shall be cleaned on the inside and outside. The steam cleaner and/or high pressure hot water washer shall be capable of generating a pressure of at least 2000 psi and producing steam and/or hot water at 200°F.

2. Rinse thoroughly with tap water (potable). Tap water may be applied with a pressurized sprayer.

3. Rinse thoroughly with organic-free water, using a non-interfering container. These containers are made of glass, Teflon, or stainless steel with Viton seals. No containers with brass, rubber, etc., parts may be utilized.

4. Rinse twice with pesticide-grade isopropanol, using a non-interfering container.

5. Rinse thoroughly with organic-free water using a non-interfering container and allow to air dry. Do not rinse with deionized or distilled water.

6. Wrap small equipment with aluminum foil to prevent contamination if the equipment is going to be transported to stored. Large equipment, such as augers, will be wrapped in plastic.

7. Sandblast all sampling equipment prior to STEP #1 if painted and/or if there is a build-up of rust, etc., that cannot be removed by steam and/or high pressure cleaning. All sandblasting will be performed prior to arrival on-site.

8. All well casing, tremie pipe, etc. that arrives on-site with printing and/or writing on the surface will be cleaned prior to STEP #1. Emery cloth or sand paper can be used to remove the printing/writing.

9. Tremie pipe that is made of plastic (PVC) will not be solvent rinsed during the cleaning and decontamination process. Used plastic materials that cannot be cleaned are unacceptable and will be discarded.